

Contact behaviour in the Cuban Finch, *Tiaris canora* (Gmelin)

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The adults of the many avian species avoid sitting in contact with other conspecifics; this avoidance is maintained by aggression, and leads to the formation of individual distances. Some species do not show this kind of dispersion, and as the members of a flock are preparing to rest, they come



Plate I

Allopreening in the Cuban Finch showing the ruffling of the head feathers in the allopreening invitation posture of the male.

together and sit flank to flank (clumping); this diurnal clumping may be seen in some tropical species chiefly the Psittacidae, Timaliinae, and Estrildidae. A bird which is clumping may spend some of the time in preening its neighbour (allopreening, Cullen, 1963) and I intend to refer to this complex of clumping and allopreening behaviour as "contact" behaviour.

The four species of grassquit (*Tiaris* sp.) range from northern South America, Central America to Mexico and through the West Indies. They are placed in the sub-family Fringillinae, and since the palato-maxillaries are unfused or incompletely fused, Tordoff (1954) considered them to be rather primitive; they may be closely related to the genus *Melanospiza*. All the grassquits have typical fringillid behaviour patterns, such as wing quivering in the hen's soliciting behaviour and all show courtship feeding (Goodwin, R., 1959). However, in many ways they resemble the Old World estrildids; the grassquits have a general waxbill-like comportment and the nest is domed: the latter feature may be an adaptation to a tropical habitat. The similarity to the members of the Estrildidae is also accentuated

in the Cuban Finch (*T. canora*) in that this species clumps and allopreens. The Fringillidae is an assemblage of typical "distance" species, so this makes the Cuban Finch a particularly interesting one to study since it must have evolved contact behaviour quite independently of the Estrilidae. A comparative study was thus made of the contact behaviour of *canora* and of the Red Avadavat, *Amandava amandava* (Estrilidae) in order to determine how far the behaviour of the former had converged with that of the waxbills. Observations were made on a pair of Cuban Finches which were kept in a large aviary with up to six pairs of Red Avadavats.

DESCRIPTION OF THE BEHAVIOUR

Clumping formed a distinct part of the activity cycle of the Cuban Finches; periods of foraging and flying from branch to branch alternated

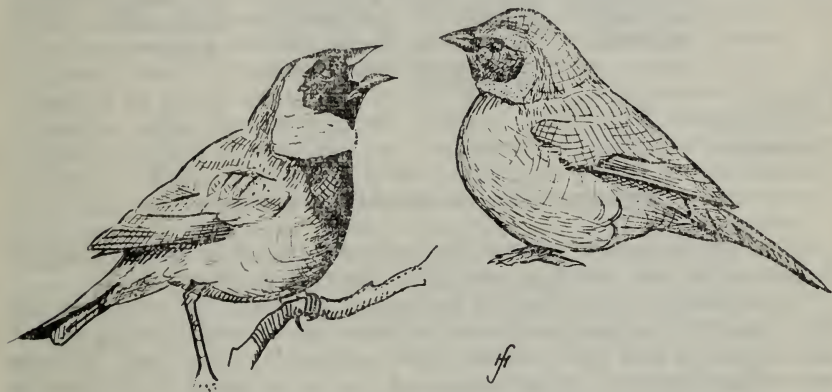


Figure 1
Bill gaping in the male Cuban Finch, followed by head ruffling.

with clumping, and bouts of sitting in contact of up to twenty minutes were recorded. The finches were never seen to clump with the avadavats but in an aviary in the London Zoological Gardens, a cock *canora* regularly used to clump with a cock Red-cheeked Cordon-bleu (*Uraeginthus bengalus*). Both cock and hen Cuban Finches kept in communication with each other by a series of wheezy "seeps", but these were rarely uttered while they were clumping. Many of the allopreening bouts took place at the beginning of a period of clumping and after a few minutes, both birds would sit quietly with the eyes partly closed and the head feathers slightly raised, as in the avadavats. Very often, one of the clumping finches would hop smartly away from its mate, only to return immediately to the other flank of its clumping partner. These "change rounds" would sometimes go on for ten or more seconds, and it gave the impression that the birds were trying to get into a comfortable position.

The allopreening behaviour of the Red Avadavat normally consists of the preener drawing the head feathers in turn through the gently mandibulating bill; occasionally the bout is preceded by a peck, or else the allopreening can be definitely called aggressive (Goodwin, D., 1960; Sparks, 1962, 1964 a & b). In the Cuban Finch, most of the allopreening

bouts were noticeably different from that described above; they consisted of a series of stabs delivered sometimes with a partly opened bill to the head of the recipient; the stabs appeared to be "inhibited" at the last moment, and after a number had been delivered, the typical, although rather rough, feather grasping action of preening could be observed; on other occasions little or no overt aggression could be detected. Table 1 compares the number of allopreening bouts which were preceded by hostile behaviour and those in which no aggression could be detected, for the finches and for the avadavats; aggression was far more evident in the former species.

TABLE 1

An analysis of the contexts in which allopreening takes place in *T. canora* and *A. amandava*. The results were obtained from 1 pair of *canora* over 3 hours observation, and from 3 pairs of *amandava* over 6 hours observation.

	Allopreening preceded by aggression.	Allopreening preceded or followed both by the act or autopreening.	Allopreening not preceded by aggression or autopreening.	Allopreening in response to clumping.	Total
<i>T. canora</i>	28	4	30	8	70
% of Total	40%	6%	43%	11%	
<i>A. amandava</i>	13	100	47	35	195
% of total	7%	49%	26%	18%	

The percentages are expressed to the nearest 1%.

On several occasions, the cock finch was seen to pull out some ear-covert feathers of the hen; plucking was rarely observed in the avadavats.

For a month or two after the birds were obtained, one would zig-zag up to the other, stopping short, and then lean forward and preen the other's head region, so that the two birds were a centimetre or two apart. This has been called "distance" allopreening and it is more typical of allopreening encounters in the Corvidae. One week after the finches had been liberated into the aviary, the number of contact and distance allopreening bouts was noted synchronously for this species and for the avadavats. (Table 2.)

TABLE 2

The number of distance and contact allopreening bouts in *T. canora* and *A. amandava* over 6 hours observation.

	Contact allopreening bouts.	Distance allopreening bouts.	Total
<i>T. canora</i>	37	24	61
% of total	60%	40%	
<i>A. amandava</i>	117	10	127
% of total	93%	7%	

The percentages are expressed to the nearest 1%.

Six months later, the percentage of distance allopreening bouts for the finches had dropped to about that recorded for the avadavats. The initially high level may have been due to the aggressiveness of the birds which tended to make them avoid clumping, and which later waned slightly. However, this phenomenon was not recorded for avadavats.

As in the avadavat, the feathers which are allopreened are chiefly restricted to the head, but occasionally those of the mantle, flanks and upper breast may receive some attention. If one of the finches starts to preen the other's wing-coverts it often elicits a hostile response.

An allopreening bout may last up to two or three minutes in the avadavat although the average duration is about 15 seconds; this is much longer than the majority of the allopreening bouts observed for the finches, which tend to last only two or three seconds.

Perhaps the most interesting part of the social behaviour of the Cuban Finch is its allopreening invitation behaviour. The term "allopreening invitation" is useful in describing the behaviour below with the exception of bill gaping, since it tends to be temporarily associated with a neighbour starting to allopreen; by using this term, it is not intended to imply that the "inviting" bird is always attempting to incite this behaviour in another bird. The factors eliciting allopreening behaviour in the Red Avadavat are rather complex (Sparks, 1964 a).

In its simplest form, the allopreening invitation behaviour of the finches resembled that of the avadavats in that the only head plumage was ruffled (Plate 1). This behaviour may be given when two birds come together or in response to being attacked or allopreened by the clumping partner. The avadavat tends to assume a horizontal, bill down posture when it approaches its clumping partner, besides raising the head feathers. On other occasions when the finches came together in order to clump, the cock turned his head towards the hen and, with the head feathers sleeked, opened his bill thus showing off the bright pink buccal cavity (Figure 1). This behaviour would be followed by allopreening invitation behaviour in that there would be a full ruffling of the head plumage and an outburst of allopreening by the hen. In Olive Finches (*T. olivacea*), bill gaping is an aggressive component, and it is usually combined with a head forward threat; this tends to be followed by bill fencing and the subsequent flight of the least aggressively motivated individual. In *canora*, bill fencing often led into allopreening behaviour but sometimes the hen would interlock her bill with the cock's as in courtship feeding; bill touching was not preceded by regurgitation movements although on several occasions the cock had a seed between his mandibles after the hen had disengaged her bill.

The most interesting component of the allopreening invitation behaviour observed in the finches was wing vibration. These wing movements were given in response to the mate approaching in order to clump; the sitting bird would suddenly assume an upright body posture with the neck stretched upwards and the head plumage erected; the wings would be vibrated in a dorso-lateral plane away from the body. This particular display, which was usually performed by the cock, was observed many times and it usually was concluded by the approaching bird starting to allopreen the actor.

Avadavats do not show wing quivering but when they are "attempting" to induce a neighbour to allopreen, an avadavat may resort to butting with the forehead (Sparks, 1964 a & b), and while it is inviting allopreening by the normal, relaxed posture with the head feathers ruffled, it may often mandibulate the bill at a frequency of about 10/second (Sparks, *loc. cit.*).

A Cuban Finch which is sitting flank to flank with its clumping partner, may respond in a number of ways to being allopreened. It usually fully ruffles the head feathers and it may withdraw the neck and close its eyes. However, vertical neck stretching with the eyes opened and the head plumage ruffled was a common response in the finches but rare in the

avadavats. Both species occasionally yawn while they are being preened by a clumping partner. An avadavat which is being allopreened rarely reacts aggressively to its preener but a finch often pecked its clumping partner after it had finished allopreening; in this context the aggression was not sufficient to cause the clumping partner to retreat.

DISCUSSION

It is not altogether clear why some species of birds have developed diurnal as well as nocturnal clumping behaviour, but originally it may have been an adaptation which helped small tropical birds to withstand large daily temperature excursions (Koenig, 1951; Sparks, 1946 a). In the African Estrildidae, habitat seems to be very important in determining whether clumping behaviour should evolve; those species which inhabit forests tend to move about in pairs, or very small parties and tend not to clump, whereas the closely related savannah species tend to be very gregarious and cluster. The Cuban Finch is an inhabitant of open grassland with scattered thorn bushes where it tends to move about in pairs (Lembye, 1850; Grundlach, 1876).

From the recent studies by Sparks (1964 a & b) and Harrison (in prep.) the function of allopreening behaviour in facilitating clumping is clear. When two birds approach each other in order to clump, there may be an increase in their fleeing or aggressive tendencies which would prevent them gaining contact. It is thus necessary for these tendencies to be checked in contact species in order to allow the individuals to cluster. This is achieved by the development of allopreening behaviour and the allopreening invitation postures. As an individual approaches to clump, the neighbour will tend to attack it (Sparks, 1962) but the clumping bird, by ruffling its head feathers, counteracts this tendency and elicits a grooming response. Thus the allopreening invitation behaviour acts as an aggression blocking mechanism in contact species.

In the Red Avadavat, there seems to be a reduction in intra-specific aggression outside the breeding session, and this no doubt helps to facilitate clumping behaviour. In the finches, both birds tended to be very aggressive towards each other and towards the avadavats. Aggression was also very marked in the allopreening of the finches, indeed, very often it was difficult to tell the difference between a bout of allopreening and a series of aggressive pecks. This problem was never experienced in the case of the avadavats, or any other estrildid species studied so far. Some Olive Finches which were kept were even more aggressive than the Cuban Finches, and the former species does not indulge in contact behaviour. When avadavats are clustering, they spend much of the time in autopreening, and this behaviour often leads to allopreening (Sparks, 1964 a & b), but clumping Cuban Finches tend to sit very still, and most of their autopreening is carried out when they are apart. The lack of movement may serve to avoid provoking an aggressive or an avoiding response from the clumping partner, and in this species the former response seems to be very easily aroused. The behaviour of the *canora* gave the impression that they were not very well adjusted contact species in that aggression was not as well controlled by the allopreening invitation behaviour as in the *amandava*.

Goodwin, R. (1959), has stated that wing quivering in the species of *Tiaris* is restricted to the juvenile begging behaviour, the female courtship

feeding invitation behaviour, and in *bicolor* and *olivacea* it seems to be incorporated into the cock courtship displays; wing quivering was not observed in the cock Cuban Finch's precopulatory display. Behaviour resembling juvenile begging may be produced when a bird is subjected to a conflict between a low tendency to withdraw from a more dominant individual and a low tendency to remain near it. In, for example, the Zebra Finch *Taeniopygia castanotis* (Immelmann, 1962) this motivational state may cause a bird to assume a submission posture. Now, allopreening invitation behaviour may be given by a submissive individual when confronted by a more dominant bird (Goodwin, D., 1960). The wing quivering described here in the allopreening invitation behaviour of the Cuban Finches may well have been induced by a low tendency to flee from the approaching clumping partner (fear) and a strong tendency to remain in order to clump with it.

Bill gaping seemed to be an aggressive component. When two Olive Finches came together, they tend to attack each other, and the aggression is preceded by bill gaping. Cuban Finches also gape in this context, but instead of drawing apart they often clump, and one of the gaping birds will start to preen the other. The less dominant individual's attacking tendency may wane and as it does so, the bill gaping response changes to the ruffled head posture. The elevation of the head feathers may be responsible for inciting an allopreening rather than an aggressive response in the other individual.

SUMMARY

The contact behaviour of the Cuban Finch has been compared with that of the Red Avadavat. The similarities must be the result of convergent evolution, but the finch is more aggressive than the avadavat and this is reflected by the closer association between aggression and allopreening in the former.

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